

SAFETY & HEALTH BULLETIN

Assistant Secretary for Environment, Safety & Health • U.S. Department of Energy • Washington, D.C. 20585

DOE/EH-0196

Issue No. 97-6

November 1997

DOE Quality Assurance Working Group Suspect/Counterfeit Item Advisory Suspect/Counterfeit Stainless Steel Fasteners

Purpose

To provide follow-up information to the previous notification sent to the DOE field and contractor organizations in late 1996.

Background

In November, 1993, the Industrial Fastener Institute (IFI) issued a Fastener Advisory regarding 18-8 stainless steel bolts. The advisory warned about a "bait and switch" tactic in which a distributor takes an 18-8 bolt (indicated by two radial lines 90 degrees apart), but no manufacturer's marking, and sells them as ASTM A320 Grade B8 bolts after hand-stamping *B8* on to the heads.

As a result of this IFI Advisory, DOE sites conducted a search of facility stores for stainless steel fasteners with hand-stamped B8 grade marks. Hundreds of stainless steel bolts with hand-stamped B8 grade markings, along with a variety of other raised and depressed head and manufacturer's markings, were identified in facility stores throughout the DOE complex. For example, an inspection of shop stock at a Hanford Site facility revealed bolts with three different raised grade markings, *18-8*, *304*, and *F593C*, along with raised manufacturers' identifications of *CK*, *H*, *HP*, *C*, *SO*, *CS*, *PMC*, *TH*, *THE*, and a *STAR*. The majority of the remaining samples found at Hanford exhibited raised grade markings of *18-8* and *304*, with a *B8* grade marking and manufacturer's identification hand-stamped into the head of the bolt. Finally, a few samples did not display any manufacturer's markings. Most of the bolts discovered were purchased with the specification to meet a national consensus standard, American Society for Testing and Materials (ASTM) A193, B8 Class 1 rather than the ASTM A320 standard discussed in the IFI warning. Examples of the appearance of these fasteners is displayed in Attachment 1.

The Savannah River Site also conducted a site-wide search of facility stores with similar results. A total of

159 stainless steel fasteners with hand-stamped *B8* grade marks and raised or hand-stamped manufacturer's symbols were found. Fifteen stainless steel fasteners that had no manufacturer's symbol were also found.

Issue

The requirements of the ASTM A193 standard regarding fastener marking and certification are very similar those required by the ASTM A320 standard discussed in the IFI advisory. The ASTM A193 standard requires that grade and manufacturer's identification symbols be applied to the heads of bolts that are larger than 1/4" in diameter. The standard, however, does not specifically differentiate between raised and depressed head markings, but states only that "for the purposes of identification marking, the manufacturer is considered the organization that certifies the fastener was manufactured, sampled, tested, and inspected in accordance with this specification." In other words, the standard allows for some of the required markings to be formed into the head of the bolt (either raised or lowered) during manufacturing, and the rest to be applied later on via hand-stamping.

Since ASTM A193 does not differentiate between raised and depressed markings, these fasteners can be counterfeited in the same way as the ASTM A320 fasteners discussed in the November 1993 IFI warning. For example, distributors can procure 18-8 stainless steel bolts that were manufactured by an anonymous party, and without conducting the necessary upgrading process or certification testing, a second party could hand-stamp *B8* and a manufacturer's marking into the heads to indicate that the fasteners exhibit the mechanical and chemical properties required of ASTM A193 Grade B8 Class 1. Unless the certification documentation is specifically requested, and in most cases it is not, there is no way to determine by visual inspection whether these fasteners were properly certified and tested to meet the requirements of the ASTM standard.

Discussion

The last set of examples in Attachment 1, samples 6, 14, 15, and 16, are clear examples of the practices the IFI Advisory warns against. Sample 6 had raised markings of two radial lines 90 degrees apart, a raised manufacturer's identification marking of *H*, a hand-stamped manufacturer's marking of *P*, and a hand-stamped *B8* grade marking. In other words, this sample had two manufacturer's identification markings, one raised and one hand-stamped. The other three samples, 14, 15, and 16 had raised letters *F593C*, raised manufacturers' markings of either *TH* or *THE*, and hand-stamped *B8* grade markings. In this case, these fasteners contained a head marking, *F593C*, that indicates that they meet a different standard, ASTM F593C. Note that the two standards require different chemical and mechanical properties, which are mutually exclusive. For example, ASTM F593C indicates a different base metal, heat treatment, and hardness and tensile strength range. In short, these fasteners were manufactured to ASTM F593C and the markings were altered (a *B8* was hand-stamped on the head) to indicate conformance with a different non-compatible standard, ASTM A193 Grade B8 Class 1. Additionally, sample 16 contained the same types of markings plus a raised STAR. This sample is suspect/counterfeit for the same reasons as samples 14 and 15, plus the additional discrepancy of two manufacturers' identification markings, a raised *TH* and a raised STAR.

Since the ASTM A193 standard clearly states that a manufacturer's identification symbol shall be applied, the samples found at Hanford and Savannah River Site that had no manufacturer's marking are clearly nonconforming. For the remaining samples found at these sites, evaluating whether or not they meet the requirements of the ASTM A193 is not as straightforward. For example, sample numbers 1, 2, 3, 5, 8, 9, 10, 11, 12, and 13 in Attachment 1 had raised markings of two radial lines 90 degrees apart, and/or *304* and raised manufacturers' identification markings of *CK*, *HP*, a *STAR*, *SO*, *CS*, *PMC*, *TH*, *C*, *THE*, and *HP*. These fasteners also had the grade mark *B8* hand-stamped into the heads. In other words, these fasteners contained the markings required by the standard (grade and manufacturer's identification) in addition to markings not required by but not specifically excluded from the standard (two radial lines 90 degrees apart to indicate 18-8 stainless steel, and/or *304*). Since a vendor could have purchased 18-8 stainless steel fasteners and, without conducting the required upgrading and testing, hand-stamped a *B8* on the head, it is possible for some or all of these fasteners to be counterfeit. Furthermore, depending on how the standard is interpreted, these fasteners could be evaluated upon receipt inspection as either conforming or suspect/counterfeit.

Another example of samples that could be evaluated as either conforming or suspect/counterfeit during a receipt inspection are samples 4, and 7. These samples had raised markings of two radial lines 90 degrees apart, hand-stamped *B8* grade markings, and hand-stamped manufacturers' identification markings of *P*, and *A*. Once again, these fasteners

contained head markings not required by but not specifically excluded from the standard (two radial lines 90 degrees apart) along with grade and manufacturers' identification markings required by the standard. The difference here is that both the grade and manufacturers' identification markings were hand-stamped. Once again, a vendor could have purchased 18-8 stainless steel fasteners and, without conducting the required upgrading and testing, hand-stamped a *B8* and manufacturer's identification marking on the head. Depending on how the standard is interpreted, these fasteners could also be evaluated upon receipt inspection as either conforming or suspect/counterfeit.

Implications

Similar fasteners may also be in storage or installed in equipment at other DOE sites. Depending on the application, use of these fasteners in systems and equipment may adversely affect the safety and health of workers, the public, or the environment.

Actions to be Considered

DOE Field Elements should coordinate with contractors to ensure appropriate actions are taken in accordance with DOE O 440.1. These actions include inventory inspections, prevention of future acceptance, identifying installed fasteners, and disposing of any found that are similar to those described above. If these or other suspect fasteners are found, the actions taken should follow the requirements established in DOE Order 440.1, page Change No. 2, dated October 21, 1996. For further information regarding this issue, please contact the Office of Nuclear Safety Policy and Standards at (301) 903-3465 or the Quality Assurance Working Group's technical point-of-contact, Charles Kasch, at (509) 376-5183.

References

DOE G 440.1-6, Implementation Guide for use with Suspect/Counterfeit Item Requirements of DOE O 440.1, WORKER PROTECTION MANAGEMENT; 10 CFR 830.120; and DOE 5700.6C, QUALITY ASSURANCE. DOE O 232.1, OCCURRENCE REPORTING AND PROCESSING OF OPERATIONS INFORMATION, Sept 1995.



This Safety & Health Bulletin is one in a series of publications issued by EH to share occupational safety and health information throughout the DOE complex. To be added to the Distribution List or to obtain copies of the publication, call

1-800-473-4375 or (301) 903-0449. For additional information regarding the publications, call Mary Cunningham at (301) 903-2072.

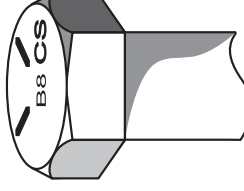
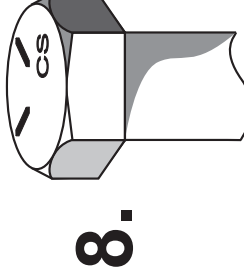
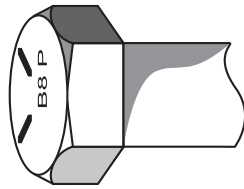
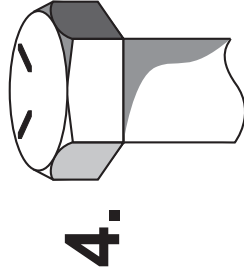
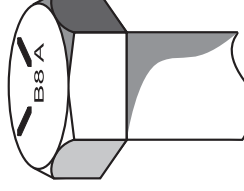
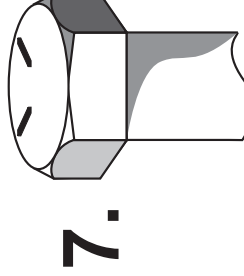
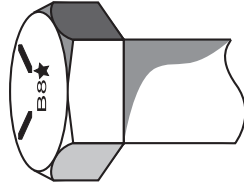
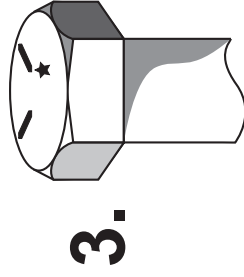
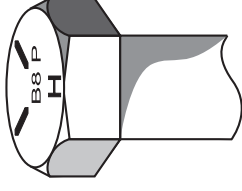
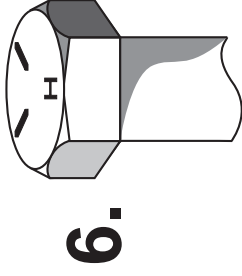
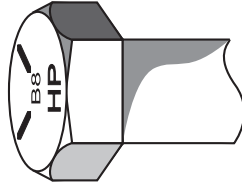
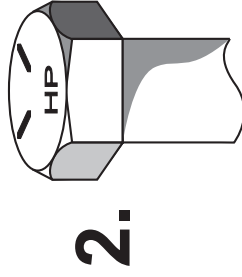
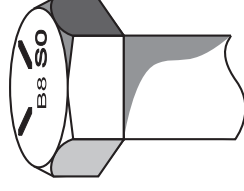
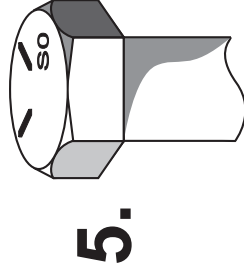
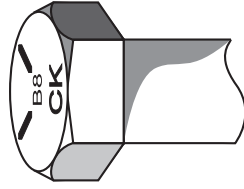
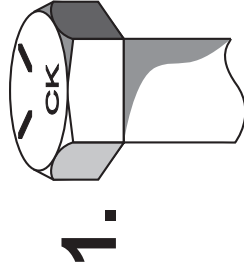
Examples of Fasteners Found at the Hanford Site

HEAD MARKINGS
BEFORE HAND STAMPING

HEAD MARKINGS
AFTER HAND STAMPING

HEAD MARKINGS
BEFORE HAND STAMPING

HEAD MARKINGS
AFTER HAND STAMPING



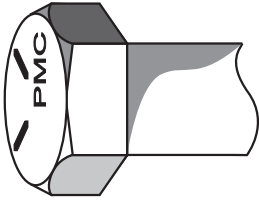
Examples of Fasteners Found at the Hanford Site

HEAD MARKINGS
BEFORE HAND STAMPING

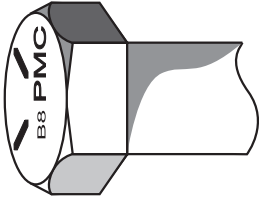
HEAD MARKINGS
AFTER HAND STAMPING

HEAD MARKINGS
BEFORE HAND STAMPING

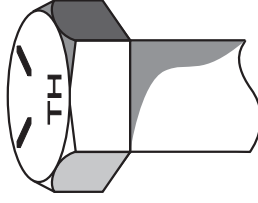
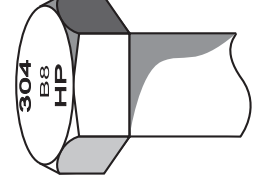
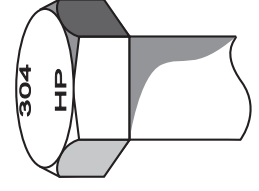
HEAD MARKINGS
AFTER HAND STAMPING



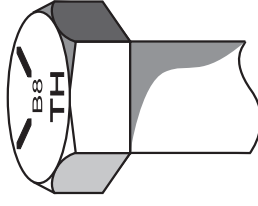
9.



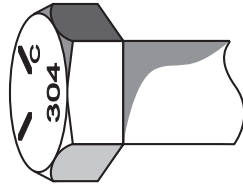
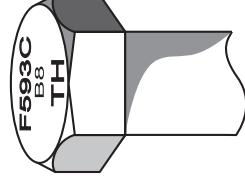
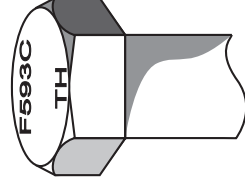
13.



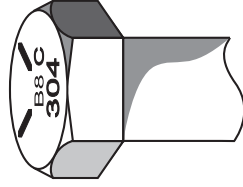
10.



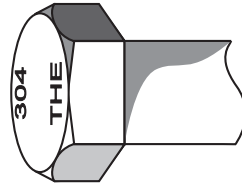
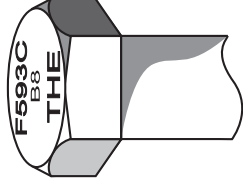
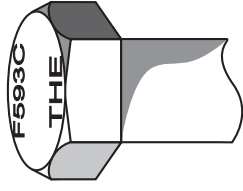
14.



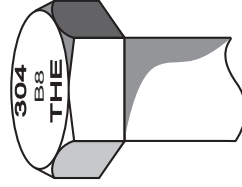
11.



15.



12.



16.

